



Research on the phenomenon of asymmetric information in construction projects — The case of China

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Received 8 January 2014; received in revised form 5 October 2014; accepted 13 October 2014
Available online 11 November 2014

Abstract

From the perspective of information economics, asymmetric information leads to opportunistic behavior, which is the primary cause of loss and risk in the construction market. This research studies on the probability and impacts of asymmetric information phenomena systematically and focuses on information asymmetry among owners, contractors and supervisors. This is conducted by inviting construction industry participants in China to evaluate asymmetric information phenomena in project management by questionnaires. The evaluation includes two stages, i.e. bidding stage and performance stage. Risk significant index is used to identify the key asymmetric information phenomena. “Owner’s financial condition” and “Owner’s ability to pay progress payments” gains the highest score in these two stages respectively. The research helps to distinguish the primary and secondary order of asymmetric information phenomena and improves the efficiency of project management. Principal participants may use it as a reference to prevent and reduce the uncertainty and risk in project management.

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Keywords: Information asymmetry; Project management; Principal participants; China

1. Introduction

Project management is a complex system that faces many uncertainties. In the bidding stage, even though the bidder and the tenderer have a cooperative relationship in the construction of the project, the tenderer cannot know all about the benefit relationships between the bidders, so the tenderer will face the risk of accepting an irrational price which called adverse selection risk. For instance, in a tendering process which bidding without base price, some bidders privately reached “under the table agreement”, consequently the tender price was higher than estimated cost more than 10% (Wang and Zhang, 2004). In performance stage, some contractors use inferior materials, reduce design standards and the necessary investment in construction or use other organizational measures to reduce the

cost of construction project, which leads to substandard building products, namely the moral hazard. Such as a fishing port project in Hainan province, the contractors failed to follow the design drawings and construction standards in construction, which caused serious quality problems, and the 4000 million-invested fishing port became a “discard port”, with a severe loss of state property.

From the information economics perspective, these phenomena are caused by Asymmetric Information (AI) among participants involved in the project. AI is put forward for the first time by Arrow (1963). Akerlof (1970) makes a further elaboration in the paper “lemon market”, which creates the beginning of adverse selection. Then Spence (1973) proposes signal theory to solve the low efficiency of market adverse selection problems. Holmstrom (1979) makes an analysis of the moral risk and its observability, and points out that the individual’s behavior is difficult to observe. Therefore, it leads to information asymmetry, which causes the presence of moral risk. In real economic activities, the participants may deliberately conceal part of the information for their own interests, so behavior agents are

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unaware of all the related knowledge and cannot foresee the future precisely when they make decisions, therefore they will face with uncertainty and risk inevitably (Sha et al., 2004; Xiang and Lu, 2011). Virtually uncertainty is a state of incomplete information, which can lead to opportunistic behavior, i.e. adverse selection and moral risk, is the primary cause of project risk. Therefore, the research on AIs in project management, not only has full feasibility, but also has practical significance. Summing up AIs in project management, eliminating the main AIs can effectively reduce the possibility of risks that participants may face with and increase the efficiency of project management (Qi and Sheng, 2008).

Meanwhile, the Chinese construction market plays an important role in global building market. According to the Top 225 International Contractors in 2012 released by ENR (Engineering News-Record), 41 companies in Chinese mainland are on the list, accounting for 18.22%. The total income of Chinese mainland contractors is 4383 billion U.S. dollars, accounting for 34.48% of the largest general contractors' general income (Chen and Li, 2012). Chinese construction market shares 18% in the global construction industry and grows steadily, so the research on Chinese project management information asymmetry has a significant practical significance, which can effectively promote the orderly and healthy development in global construction market.

This paper mainly researches on AIs in project management in China. Several AIs are collected from specialists and related literatures, ranked through questionnaires. Through the data analysis high probability and influential AIs in project management are summarized. Discussing about these AIs can help increase information transparency in the construction market, reduce the cost of information collection, and promote the healthy and orderly development of project management.

2. Literature review

In recent years, the researches on AI are widely involved in finance, insurance, labor, risk management and construction projects, etc. In this background, domestic and international relevant scholars have started in-depth study of the application of AIs in construction projects.

2.1. General situation of AIs in project management

One of the important applications of AI in project management is the principal–agent problem (Jager, 2008). Lampel et al. (1996) discuss about AI and the scientific technology innovation in large scale project. Zhang and Guan (2000) propose the information model of construction and AI problems, and quantity analysis method is used to study how to determine the moderate symmetry range. Then Li and Yu (2002) discuss the relationship among the information symmetry, engineering cost and engineering income, and do a theoretical discussion about moderate symmetry range between owners and contractors. To know well about AIs among the participants, Turner and Muller (2003) point out that the owner has a principal–agent relationship with the

contractor. One of the key problems of the principal–agent relationship is “incentive”. Therefore, how to explore the optimal incentive mechanism is the key to the success of the project. Verma and Terpenney (2005) put forward a dynamic project management thought based on the principal–agent model, which considers that the change of the principal participants' behavior can solve the problems of information asymmetry in project management. The principal–agent problems arise because of conflicting interests and AIs between principals and agents, and to improve the construction agent management model by establishing incentive and restraint mechanisms, strengthening contract management and implementing project guarantees and insurance system (Deng, 2006). Cerić (2012) uses the principal–agent theory to study the communication risk among the owner, the contractor and the project manager, he thinks that before the contract signing AI mainly exists between the owner and the contractor, and after signing the contract AI mainly exists between the owner and the project manager.

2.2. Major AIs in previous literatures

In recent years, the researches on AI are widely involved in finance, insurance, labor, risk management and construction projects, etc. In this background, domestic and international relevant scholars have started in-depth study of the application of AIs in construction projects. For instance, in the real estate market, developers are prone to take advantage of their own information to get high profits. Or they may not conform to the quality requirements or appear malicious speculation behavior in house sales (Cai and Jiang, 2003). Zhang and Guan (2000), Xiang et al. (2006), and Zheng (2010) emphatically discuss AIs between the owner and the contractor. In the bidding stage, owners are clearer about their own building intention, the financial condition, the project procedure, the transparency in evaluation of bid, etc. But the owner knows less about the contractor's technology, ability, equipment, management, and other information. In the contract implementation, the contractor knows more about their own building behavior than the owner, who is in the information advantage, but the contractor does not know about the credit and financial ability of the owner, at this point the contractor belongs to the information underdog. Huai and Wang (2004) focus on AIs between the owner and the supervisor. In the bidding stage, the supervisor's information advantages include the unit qualification, credit standing and financial position, performance, technology, the number of employees and their quality, etc. In the performance stage, the supervisor's information advantages mainly contain the number of supervision engineer, technical skills, professional moral risk, etc. Zhu and Li (2005) discuss about moral hazard of contractors under information asymmetry. In the contract implementation, the contractor may suits his own interests through a claim or improper means, such as cutting corners, and reduces the investment in the construction measures to reduce the actual cost. Ye and Zhang (2008) propose information advantage of the owner is construction intention and pay ability, which is information disadvantage of the supervisor and contractor. The qualification, credibility,

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